INSTRUCTION MANUAL

MODEL 317

AMPLITUDE DISTRIBUTION ANALYZER

FOR SERIAL # 164

- REGULATED POWER SUPPLIES
- ELECTRONIC INSTRUMENTS

Quan-Tech

LABORATORIES INC.

BOONTON, N. J.

INSTRUCTION MANUAL

MODEL 317

AMPLITUDE DISTRIBUTION ANALYZER

FOR SERIAL # 164

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60 PARSIPPANY BLVD. BOONTON, NEW JERSEY

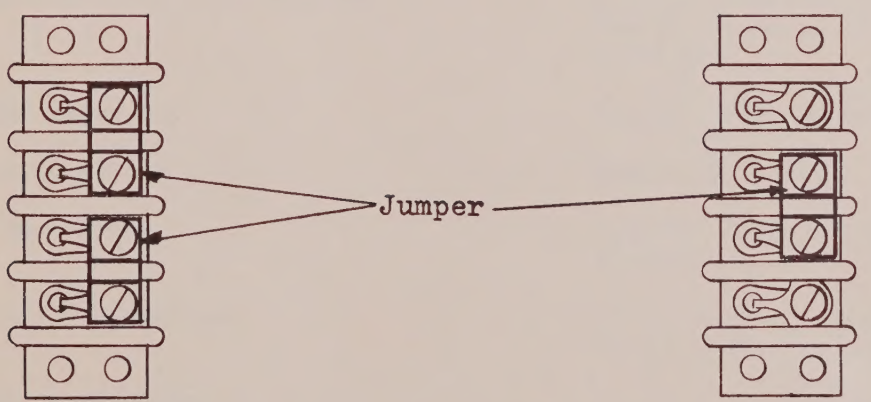
TELEPHONE DE 4-8500

NOTICE

This instrument is designed to operate from a 117 volt A.C. or 234 volt A.C. power source. The nameplate located near the power cord indicates the voltage at which the instrument should be operated.

Should it be desired to change the input voltage:

1. Change transformer primary connections by moving the jumpers on the 4 terminal barrier strip located near the power cord (See figure below).
2. Change fuse (See figure below).
3. Reverse the nameplate located near the power cord.



For 117 Volt Operation
Fuse 1/4 Amp Slow Blow

For 234 Volt Operation
Fuse 1/8 Amp Slow Blow

MODEL 317

Instruction Manual

GENERAL

The Model 317 Amplitude Distribution Analyzer is designed to measure the amplitude distribution of non-repetitive or random signals. In addition, a counter output jack is provided so the number of times a threshold level is exceeded can be measured. Since the information that may be obtained from a random signal consists of a frequency analysis and an amplitude analysis, the Model 317 is an ideal instrument for determining if the signal is Gaussian in nature or has its own peculiar distribution.

SPECIFICATIONS

Switching Rate	5 mc. max.
Percent of Time Range	100%, 10%, and 1% full scale for both normal and inverted operation.
Percent of Time Accuracy	± 3% of full scale.
Input Level Sensitivity	0.1, 1 and 10 volts, peak to peak.
Input Level Accuracy	± 3% with variable attenuator full clockwise.
Amplifier Frequency Response	± 3% 50 ~ to 500 KC approx. -3 db at 12 ~ and 1 mc.
Input Impedance	Approx. 10K + 50 uuf.
Counter Output	Approx. 0.5 volt.
Primary Power	117/234V, 50-60 cycles, 7 watts.
Physical Dimensions	8¼" h. x 5" w. x 6 3/4 d. Weight 5 lbs.

OPERATING INSTRUCTIONS

To operate the Model 317 the step-by-step instructions listed below should be followed:

1. Plug the unit into a suitable source of 105 to 125 volts, 50 to 60 cycle line.

2. Apply the signal to the IN binding posts, making sure that the peak-to-peak levels of the signal to be measured do not exceed the values on the attenuators.

3. The VAR ATTEN should be extreme clockwise.

4. Rotate the LEVEL control multiturn knob to indicate zero. A meter reading of 100% should be obtained. If meter reading is less than 100%, the peak amplitude of the signals is exceeding the level set.

5. Adjust LEVEL to 100 on the knob and make a meter reading. Continue to adjust level to higher and higher values until a LEVEL setting of 1000 is obtained. At this point, the % OF TIME measure should be 0%. If a plot of amplitude level vs. percent of time is made, the result will be the amplitude distribution of the signal.

6. If the peak amplitudes as indicated under Step 4 are in excess of the maximum and minimum LEVEL adjusts, the VAR ATTEN may be adjusted so that only an occasional peak amplitude will indicate on the meter. At this point the instrument is calibrated in relative amplitudes.

7. To measure small percentages of time, the meter sensitivity may be adjusted to either 10% or 1% full scale values. These measurements of course can be made only near the upper end of the LEVEL control.

8. If measurement of small percentages is desired at the opposite polarity of the signal, the NORM - INV switch may be moved to the INV position and small percentages of time again may be measured at the upper end of the LEVEL adjustment.

   NOTE: The NORM - INV switch is merely a phase-inverter of the AC signal from the pre-amplifier and does not affect any other portion of the circuitry.

9. For automatic plotting or a display on an oscilloscope, a slow moving ramp function of zero to 10 volts positive may be applied to the EXT LEVEL jack at the rear of the instrument.

   NOTE: Do not overdrive this point excessively or damage will occur to the DC coupled transistors. An analog output proportional to the 100% full scale meter reading may be obtained from the ANALOG output at the rear of the instrument. If the ramp and the analog are applied to the horizontal and vertical axis of an oscilloscope or an XY Plotter, the amplitude distribution function of a signal may be plotted directly. Additional time constant may be had for the vertical axis by loading the analog output with a capacitor.

CIRCUIT DESCRIPTION

Referring to the schematic diagram, the operation of the circuit is as follows:

ATTENUATOR: The input attenuator is of the straightforward design and contains three ranges, each giving a 10 to 1 attenuation. The diodes CR9 and CR10 are protective diodes for the input of the Variable Gain Amplifier.

VARIABLE GAIN AMPLIFIER: The Variable Gain Amplifier consists of Q6 and Q7 and has a large amount of negative feedback. The gain may be varied by varying the VAR ATTEN, R21, and the pre-set gain may be adjusted by varying R19.

PHASE INVERTER: The phase inverter consists of a simple unbypassed emitter amplifier, Q8. A balance in the two output voltages in the phase inverter may be had by adjusting R30.

DIFFERENTIAL AMPLIFIER: Q9, Q10, Q11 and Q12 form the differential amplifier and the base input of Q9 operates at approximately 7 to 7½ volts with respect to the plus 18 volt supply. The same voltage should appear at the base of Q12 when the LEVEL control is set at 500. If not, a small centering adjustment R42 may be adjusted to compensate for circuit variation. This adjustment may be easily done by short-circuiting the input of the instrument and adjusting R42 so that the % OF TIME meter just switches to full scale. At this point the LEVEL control may be moved up scale approximately half a percent and the % OF TIME meter should switch to zero.

TRIGGER AND INTEGRATOR: Q14 and Q15 consist of the Schmitt trigger circuit. This is operated from the differential amplifier. CR13 maintains a level for the reference of the Schmitt trigger at 7 to 7½ volts. The meter circuitry and analog output are coupled to the collector of Q15 and are of straightforward design.

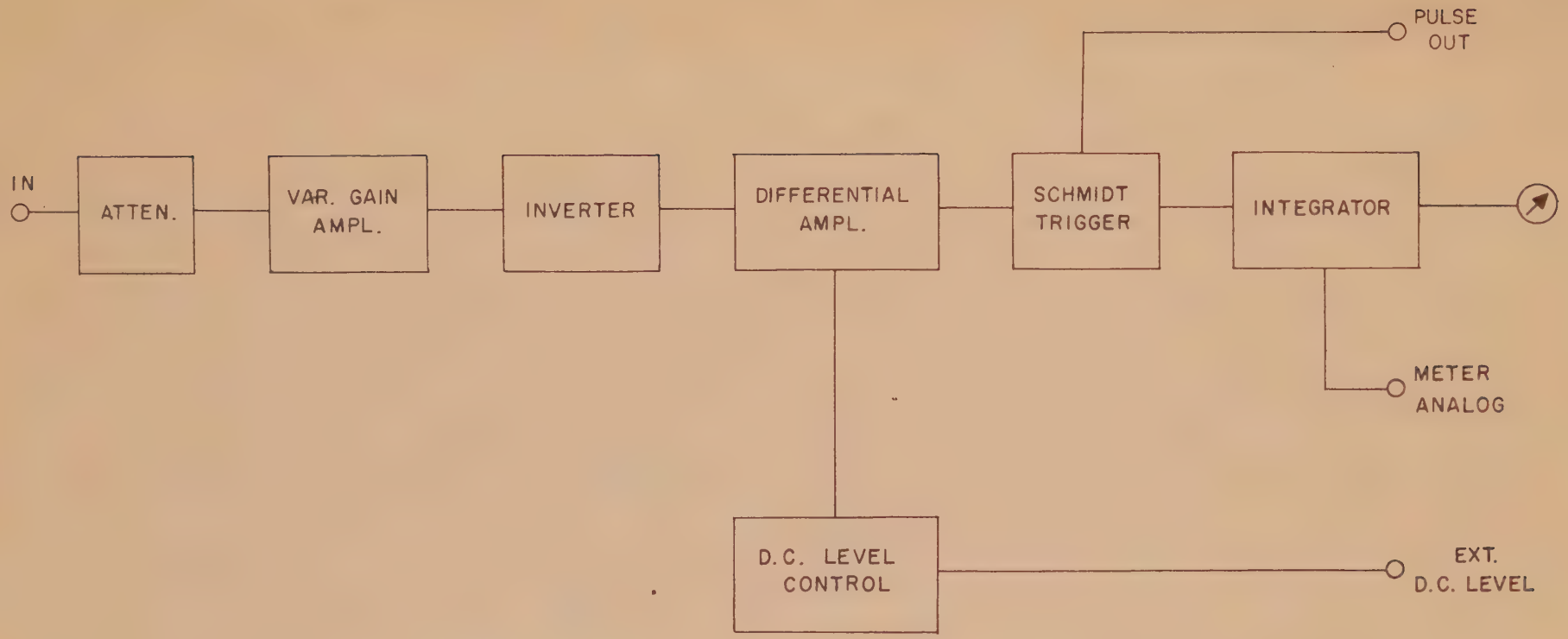
PULSE OUTPUT:

Q16 offers a low output impedance for the differentiated pulse obtained from the Schmitt trigger circuit.

POWER SUPPLY:

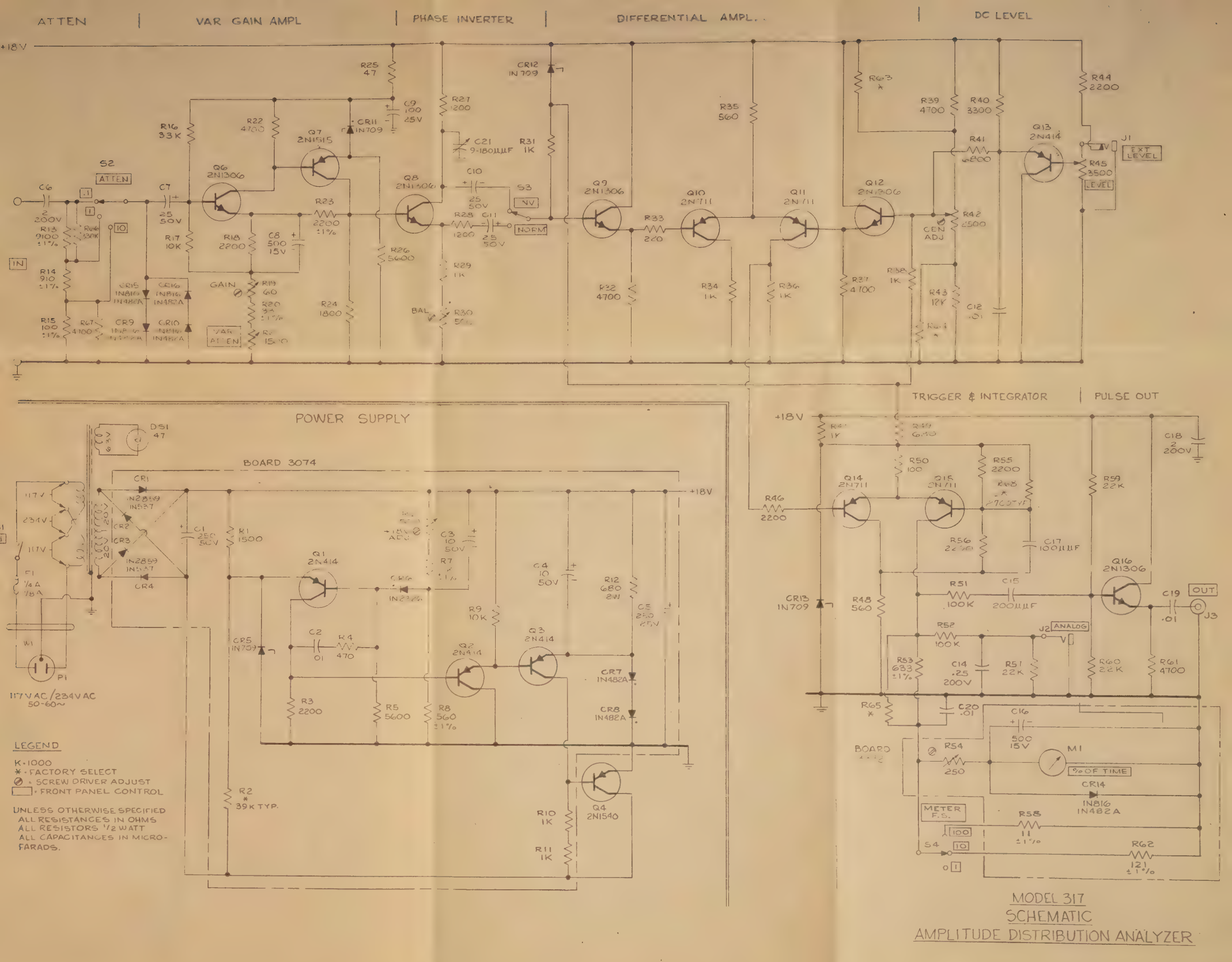
Power Supply is of the regulated type and obtains its reference voltage from CR5 at the emitter of Q1. CR6 is a temperature compensating diode so that a minimum of drift is obtained with temperature. Q2 and Q3 are current and voltage amplifiers respectively, which in turn drive the final pass transistor, Q4. Adjustment of the output voltage of the power supply may be made by R6.

NOTE: Since the circuitry following the AC amplifier is a DC device, the voltage levels of the power supply, CR12 and CR13 are critical, and if adjustment is necessary care should be taken that all these voltages are of the proper magnitude.



BLOCK DIAGRAM

MODEL 317



MODEL 317
SCHEMATIC
AMPLITUDE DISTRIBUTION ANALYZER

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electronic engineers master
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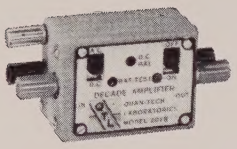
QUAN-TECH INSTRUMENTS

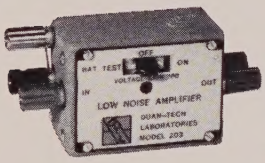


Model 201-B DC-Coupled Decade Amplifier

Highly compact and fully self-contained, the Model 201-B is a stable ac and dc amplifier providing a controlled gain of 10 over a frequency range of dc to 1 MC (±0.5db). Built in battery-condition test indicator. Two or more Model 201-B's may be plugged together in series for greater gain.

Price: $95.00

ADAPTORS: Type 1001, Banana Plug to Banana Plug, Price $2.00; Type 1002, Banana Plug to UHF Plug, Price $4.50; Type 1003, Banana Plug to BNC Plug, Price $4.50.



Model 203 Low-Noise Amplifier

Compact, very low-noise ac amplifier with controlled gain of 100. Frequency response flat from 30 cps to 100 kc (±0.5db); down 3 db at 500 kc. Equiv. noise, full bandwidth, 5 μv RMS, input shorted. Narrow band noise approx. 0.005 μv/cycle above 1 kc. Battery operated; fully self-contained; built in battery condition indicator.

Accessory Adaptor plugs:—See Model 201-B above.

Price: $125.00

Model 205 High-Stability DC Amplifier

Fully-transistorized, compact (2"x 2⅞"x1⅜"), providing controlled voltage gain of 10 over frequency range of dc to 100 kc. Maximum output voltage 5 volts p-p. Short-circuit stability of the unit approaches that of chopper-stabilized unit, typical drift being less than 3 mv up to 120°F. At constant ambient temperature, drift is less than 250 μvolts. Octal-pin base permits plug-in installation.

Price: $105.00

Model 301 AC Microammeter

Highly versatile ac current meter providing low input impedance, very high sensitivity, and isolation from ground for low-level current measurements without disturbing circuit under test. Signal output permits display of current waveforms on oscilloscope. Ideal for transistor or magnetic circuit analysis. Sensitivity: With insertion probe, 3 ua to 100 ma full scale; with clamp-on probe; 300 ua to 100 ma, full scale. With 10-amp clamp-on probe (supplied separately) 300 ua to 10 amps.

Price: $290.00

Accessory 10-amp clamp-on probe and connector.

Price: $ 65.00

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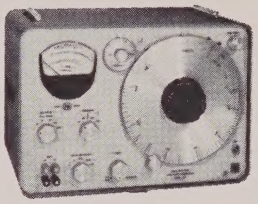

Model 303 Wave and Noise Spectrum Analyzer

Designed especially for use in ultrasonics and noise spectrum analysis. Selection of four constant bandwidths; i.e., 10 and 30 cycles (round top), 100 cps and 1 kc (flat top). Frequency range 30 cps to 100 kc, ±300 cps vernier. Sensitivity: 100 μv to 300 v full scale. Analog outputs provided for external monitoring. Sensitivity of 1 μv full scale with Quan-Tech Model 203 amplifier.

Price: $1425.00

Model 310 Transistor Noise Analyzer

Provides simultaneous analysis of transistor noise at three frequencies. System automatically corrects for variations in transistor gain. Beta, Icbo and Iebo are also included—providing measurements of essential transistor characteristics in one instrument.

Price: $2075.00

Model 311: Similar to above, except that Collector Current Range extends from 5 to 1000 uamp. Collector Current Meter Ranges are: 10, 30, 100, 300 and 1000 uamp, full scale; Icbo and Iebo Meter Ranges: 0.03, 0.1, 0.3, 1 and 3 uamp.

Price: $2275.00

Model 315 Resistor Noise Test Set

For precise, quantitative measurement of noise generated as a result of current passing through a resistor. Tests any resistor from 100 ohms to 22 megohms; conforms to recommended specifications of National Bureau of Standards for resistor noise measurements. Tests diodes and other two-terminal networks as well. Outputs provided for external monitoring or for data processing.

Price: $1700.00

Model 317 Amplitude Distribution Analyzer

Establishes the amplitude-probability distribution of a random signal; for example, to determine threshold requirements, false alarm probabilities, etc. Frequency range: 5 cps to 0.5 mc; Amplitude ranges: 100%, 10% and 1% full scale accuracy. Output to drive counter at front panel. Size 8½" (h) x 5" (w) x 6¾" (d).

Price: $395.00

We welcome requests for information regarding specific applications of Quan-Tech instruments, amplifiers and other products.

Prices and specifications are subject to change without notice. Prices noted are f.o.b. Boonton, N.J., USA.